

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Bawendi et al. Art Unit : Unknown
Serial No. : Not Yet Assigned Examiner : Unknown
Filed : August 19, 2003
Title : HIGHLY LUMINESCENT COLOR-SELECTIVE NANOCRYSTALLINE MATERIALS

Commissioner for Patents
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Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Under 35 USC §120, this application relies on the earlier filing date of application serial number 09/625,861, filed on July 26, 2000, which claims priority to U.S. Patent Application Serial No. 60/145,708, filed on July 26, 1999, and is a continuation-in-part of U.S. Patent Application Serial No. 08/969,302, filed November 13, 1997, now U.S. Patent No. 6,322,901. The following references were submitted to and/or cited by the Office in the prior application and, therefore, are not provided in this application.

This statement is being filed with the application. Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 8-19-03



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Substitute Form PTO-1449 (Modified)	U.S. Department of Commerce Patent and Trademark Office	Attorney's Docket No. 01997-276002	Application No. Not Yet Assigned
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Bawendi et al.	
(37 CFR §1.98(b))		Filing Date	Group Art Unit

U.S. Patent Documents							
Examiner Initial	Desig. ID	Document Number	Publication Date	Patentee	Class	Subclass	Filing Date If Appropriate
	AA	5,395,791	03/1995	Cheng et al.			
	AB	5,434,878	07/1995	Lawandy			
	AC	5,492,080	02/1996	Ohkawa et al.			
	AD	5,449,260	03/1996	Takahashi et al.			
	AE	5,515,393	05/1996	Okuyama et al.			
	AF	5,747,180	05/1998	Miller et al.			
	AG	5,882,779	05/1998	Alivisatos et al.			
	AH	6,306,610 B1	10/2001	Bawendi et al.			
	AI	6,322,901 B1	11/2001	Bawendi et al.			
	AJ	6,423,551 B1	07/2002	Weiss et al.			
	AK						

Foreign Patent Documents or Published Foreign Patent Applications							
Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation
							Yes No
	AL						
	AM						
	AN						
	AO						
	AP						

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	AQ	Loher et al., "Epitaxy films of the 3D semiconductor CdS on the 2D layered substrate MX2 prepared by Van der Waals epitaxy" Journal of Crystal Growth, vol. 146, 1995, pp. 408-12.
	AR	Tsuji et al., "Characterization of CdS thin film in high efficient CdS/CdTe solar cells", Journal of Crystal Growth, vol. 214/215, 2000, pp 1142-47.
	AS	U.S. Patent Application Publication, US 2002/066401, Peng et al., June 6, 2002.
	AT	U.S. Patent Application Publication, US 2003/0017264, Joseph Treadway et al., January 23, 2003.

Examiner Signature	Date Considered
EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Substitute Form PTO-1449 (Modified)		U.S. Department of Commerce Patent and Trademark Office	Attorney's Docket No. 01997-272001	Application No. 08/969,302
Information Disclosed on Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant Moungi Bawendi et al.		
		Filing Date November 13, 1997	Group Art Unit 1773	

U.S. Patent Documents							
Examiner Initial	Desig. ID	Patent Number	Issue Date	Patentee	Class	Subclass	Filing Date If Appropriate
	AA	3,996,345	12/07/1976	Ullman et al.	424	12	
	AB	4,637,988	01/20/1987	Hinshaw et al.	436	546	
	AC	4,777,128	10/11/1988	Lippa	435	5	
	AD	5,262,357	11/16/1993	Alivisatos et al.	437	233	
	AE	5,293,050	03/08/1994	Chapple-Sokol et al.	257	17	
	AF	5,304,786	04/19/1994	Pavlidis et al.	235	462	
	AG	5,354,707	10/11/1994	Chapple-Sokol et al.	437	106	
	AH	5,422,489	06/06/1995	Bhargava	250	488.1	
	AI	5,537,000	07/16/1996	Alivisatos et al.	313	506	
	AJ	5,565,324	10/15/1996	Still et al.	435	6	
	AK	5,585,640	12/17/1996	Huston et al.	250	483.1	
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	AM	5,674,698	10/07/1997	Zarling et al.	435	7.92	
	AN	5,721,099	02/24/1998	Still et al.	435	6	
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	AP	5,770,299	06/23/1998	Dannenhauer et al.	428	195	
	AQ	5,789,162	08/04/1998	Dower et al.	435	6	
	AR	5,985,353	11/16/1999	Lawton et al.	427	2.13	
	AS	5,990,479	11/23/1999	Weiss et al.	250	307	

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Examiner Initial	Desig. ID	Document Number	Publication Date	Country or Patent Office	Class	Subclass	Translation
							Yes No
	AT	WO 95/29473	11/02/1995	PCT			
	AU	WO 98/04740	02/05/1998	PCT			
	AV	WO 98/33070	07/30/1998	PCT			
	AW	WO 98/36376	08/20/1998	PCT			
	AX	WO 98/46372	10/22/1998	PCT			

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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant Mounji Bawendi et al.		
		Filing Date November 13, 1997	Group Art Unit 1773	

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Design. ID	Document
	BA	Alivisatos, "Semiconductor Clusters, Nanocrystals, and Quantum Dots," <i>Science</i> , 271:933-937, February 16, 1996
	BB	Alivisatos et al., "Organization of 'nanocrystal molecules' using DNA", <i>Nature</i> , 382:609-611, August 15, 1996
	BC	Baldwin et al., "Synthesis of a Small Molecule Combinatorial Library Encoded with Molecular Tags," <i>J. Am. Chem. Soc.</i> , 117:5588-5589, 1995
	BD	Bawendi et al., "Luminescence properties of CdSe quantum crystallites: resonance between interior and surface localized states," <i>J. Chem. Phys.</i> , 96(2):946-954, January 15, 1992
	BE	Beverloo et al., "Preparation and Microscopic Visualization of Multicolor Luminescent Immunophosphors," <i>Cytometry</i> , 13:561-570, 1992
	BF	Chee et al., "Accessing Genetic Information with High-Density DNA Arrays" <i>Science</i> , 274(5287):610-614, October 25, 1996
	BG	Coffer et al., "Characterization of quantum-confined CdS Nanocrystallites stabilized by deoxyribonucleic acid (DNA)" <i>Nanotechnology</i> , 3:69-76, 1992
	BH	Colvin et al., "Light-emitting diodes made from cadmium selenide nanocrystals and a semiconducting polymer" <i>Nature</i> , 370(6488):354-357, August 4, 1994
	BI	Cook, "Scintillation proximity assay: a versatile high-throughput screening technology," <i>Drug Discovery Today</i> , 1(7):287-294, July 1996
	BJ	Czarnik, "Encoding methods for combinatorial chemistry" <i>Curr Opin Chem Biol.</i> , 1(1):60-66, 1997
	BK	Danek et al., "Synthesis of Luminescent Thin-Film CdSe/ZnSe Quantum Dot Composites Using CdSe Quantum Dots Passivated with an Overlayer of ZnSe" <i>Chem. Mater.</i> , 8(1):173-180, 1996
	BL	Egner et al., "Tagging in combinatorial chemistry: the use of coloured and fluorescent beads" <i>Chem. Commun.</i> , 735-736, April 21, 1997
	BM	Fodor, "Techwire" <i>Science</i> , 277(5324):393-395, July 18, 1997
	BN	Guha et al., "Hybrid organic-inorganic semiconductor-based light-emitting diodes" <i>J. Appl. Phys.</i> , 82(8):4126-4128, October 15, 1997
	BO	Jarvis et al., "Solution Synthesis and Photoluminescence Studies of Small Crystallites of Cadmium Telluride," <i>Mat. Res. Soc. Symp. Proc.</i> , 272:229-234, 1992
	BP	Kagan et al., "Electronic Energy Transfer in CdSe Quantum Dot Solids," <i>Physical Review Letters</i> , 76(9):1517-1520, February 26, 1996
	BQ	Kagan et al., "Long-range resonance transfer of electronic excitations in close-packed CdSe quantum-dot solids," <i>Physical Review B</i> , 54(12):8633-8643, September 15, 1996-II
	BR	Lee et al., "Surface Derivatization of Nanocrystalline CdSe Semiconductors," <i>Mat. Res. Soc. Symp. Proc.</i> , 452:323-328, March 13, 1997
	BS	Liz-Marzan et al., "Synthesis of Nanosized Gold-Silica Core-Shell Particles" <i>Langmuir</i> , 12(18):4329-4335, 1996
	BT	Mahtab et al., "Protein-Sized Quantum Dot Luminescence Can Distinguish between 'Straight', 'Bent', and 'Kinked' Oligonucleotides", <i>J. Am. Chem. Soc.</i> , 117:9099-9100, 1995
	BU	Mahtab et al., "Preferential-Absorption of a 'Kinked' DNA to a Neutral Curved Surface: Comparison to and Implications for Nonspecific DNA-Protein Interactions," <i>J. Am. Chem. Soc.</i> , 118(30):7028-7032, 1996

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Information Disclosure Statement by Applicant (Use several sheets if necessary) (37 CFR §1.98(b))		Applicant Moungi Bawendi et al.	
		Filing Date November 13, 1997	Group Art Unit 1773

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	CA	McGall et al., "Light-directed synthesis of high-density oligonucleotide arrays using semiconductor photoresists" <i>Proc. Natl. Acad. Sci. USA</i> , 93:13555-13560, November 1996
	CB	Moran et al., "Radio Frequency Tag Encoded Combinatorial Library Method for the Discovery of Tripeptide-Substituted Cinnamic Acid Inhibitors of the Protein Tyrosine Phosphatase PTP1B" <i>J. Am. Chem. Soc.</i> , 117:10787-10788, 1995
	CC	Müllenborn et al., "Characterization of Solution-Synthesized CdTe and HgTe," <i>Applied Physics</i> , 56:317-321, 1993
	CD	Murphy et al., "Quantum Dots as Inorganic DNA-Binding Proteins," <i>Mat. Res. Soc. Symp.</i> , 452:597-600, March 13, 1997
	CE	Nicolaou et al., "Radiofrequency Encoded Combinatorial Chemistry" <i>Angew. Chem. Int. Ed. Engl.</i> , 34(20):2289-2291, 1995
	CF	Pehnt et al., "Nanoparticle precursor route to low-temperature spray deposition of CdTe thin films," <i>Appl. Phys. Lett.</i> , 67(15):2176-2178, October 1995
	CG	Peng et al., "Epitaxial Growth of Highly Luminescent CdSe/CdS Core/Shell Nanocrystals with Photostability and Electronic Accessibility," <i>J. Am. Chem. Soc.</i> , 119(30):7019-7029, 1997
	CH	Peng et al., "Synthesis and Isolation of a Homodimer of Cadmium Selenide Nanocrystals," <i>Angew. Chem. Int. Ed. Engl.</i> , 36(112):145-147, 1997
	CI	Plunkett et al., "Combinatorial Chemistry and New Drugs" <i>Sci Am.</i> , 276(4):68-73, April 1997
	CJ	Rogach et al., "Synthesis and Characterization of Thiol-Stabilized CdTe Nanocrystals" <i>Ber. Bunsenges. Phys. Chem.</i> , 100(11):1772-1778, November 1996
	CK	Schröck et al., "Multicolor Spectral Karyotyping of Human Chromosomes," <i>Science</i> , 273:494-497, July 26, 1996
	CL	Spanhel et al., "Photochemistry of Colloidal Semiconductors. Surface Modification and Stability of Strong Luminescing CdS Particles" <i>J. Am. Chem. Soc.</i> , 109(19):5649-5655, 1987
	CM	Steigerwald et al., "Surface Derivatization and Isolation of Semiconductor Cluster Molecules," <i>J. Am. Chem. Soc.</i> , 110:3046-3050, 1988
	CN	Whitesell et al., "Directionally Aligned Helical Peptides on Surfaces" <i>Science</i> , 261:73-76, July 2, 1993

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EXAMINER: Initials citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.	

Form PTO-1449
(REV 8-83)

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket No.
0492611-0289

Serial No.
08/969,302

**Supplemental
Information Disclosure Citation**
(Use several sheets if necessary)

Applicant Bawendi, *et al.*

Filing Date
Nov. 13, 1997

Group
1763

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
	5,505,928	Apr. 9, 1996	Alivisatos, <i>et al.</i>	423	299	
	5,525,377	Jun. 11, 1996	Gallagher, <i>et al.</i>	427	512	
	5,751,018	May 12, 1998	Alivisatos, <i>et al.</i>	257	64	

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	Document Number	Date	Country	Class	Subclass	Translation	
						Yes	No
	98/19963	May 14, 1998	WO				

OTHER DOCUMENTS (including Author, Title, Date, Pertinent Pages, Etc.)

	Rajh, <i>et al.</i> , "Synthesis and Characterization of Surface-Modified Colloidal CdTe Quantum Dots," <i>J. Phys. Chem.</i> 97:11999-12003, Nov. 1993.	
	Lawless, <i>et al.</i> , "Bifunctional Capping of CdS Nanoparticles and Bridging to TiO ₂ ," <i>J. Phys. Chem.</i> 99:10329-10335, 1995.	
	Gan, <i>et al.</i> , "Enhanced Photoluminescence and Characterization of Mn-Doped ZnS Nanocrystallites Synthesized in Microemulsion," <i>Langmuir</i> 1997(13):6427-6431, 1997.	
	Kuno, <i>et al.</i> , "The band edge luminescence of surface modified CdSe nanocrystallites: Probing the luminescing state," <i>J. Chem. Phys.</i> 106(23):9869-9882, June 1997.	

Examiner	Date Considered
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EXAMINER Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO-1449
(REV 8-83)

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket No.
0492611-0289

Serial No.
08/969,302

**Supplemental
Information Disclosure Citation**
(Use several sheets if necessary)

Applicant Bawendi, *et al.*

Filing Date
November 13, 1997

Group
1763

U.S. PATENT DOCUMENTS

Examiner Initial	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate
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FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country	Class	Subclass	Translation
						Yes No

OTHER DOCUMENTS (including Author, Title, Date, Pertinent Pages, Etc.)

	Mikulec, <i>et al.</i> , "Synthesis and Characterization of Highly Luminescent (CdSe)ZnS Quantum Dots," <i>Materials Research Society Symposium</i> :359-364, Boston, MA, December 2-6, 1997.	
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Examiner Date Considered

Exchange.3007211.1

EXAMINER Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

F rm PTO-1449
(REV. 8-83)

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket
MIT 7771

Serial No.

INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

Applicant:
Bawendi et al.

Filing Date:
11/13/97

Group

U. S. PATENT DOCUMENTS

Examiner's Initials	U.S. Patent No.	Applicant	Issue Date

FOREIGN PATENT DOCUMENTS

Examiner's Initials	Document No.	Country	Date	Translation	
				Yes	No

OTHER DOCUMENTS

(Including Author, Title, Date, Pertinent Pages, Etc.)

	Masumoto et al. "Preparation of Monodisperse CdS Nanocrystals by Size Selective Photocorrosion" <i>J. Phys. Chem.</i> 100 (32):13782 (August 1996)
	Colvin et al. "Light-Emitting Diodes Made from Cadmium Selenide Nanocrystals and a Semiconducting Polymer" <i>Nature</i> 370 :354 (August 1994)
	B.O. Dabbousi and M.G. Bawendi "Electroluminescence from CdSe Quantum-Dot/Polymer Composites" <i>Appl. Phys. Lett.</i> 66 (11):1316 (March 1995)
	Kortan et al. "Nucleation and Growth of CdSe on ZnS Quantum Crystallite Seeds, and Vice Versa, in Inverse Micelle Media" <i>J. Am. Chem. Soc.</i> 112 :1327 (1990)
	Nirmal et al. "Fluorescence Intermittency in single Cadmium Selenide Nanocrystals" <i>Nature</i> 383 :802 (October 1996)
	Murray et al. "Synthesis and Characterization of Nearly Monodisperse CdE (E = S, Se, Te) Semiconductor Nanocrystallites" <i>J. Am. Chem. Soc.</i> 115 :8706 (1993)
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	M.A. Hines and P. Guyot-Sionnest "Synthesis and Characterization of Strongly Luminescing ZnS-Capped CdSe Nanocrystals" <i>J. Phys. Chem.</i> 100 :468 (January 1996)
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Form PTO-1449
(REV. 8-83)

U.S. Department of Commerce
Patent and Trademark Office

Atty. Docket
MIT 7771

Serial No.

INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

Applicant:
Bawendi et al.

Filing Date:
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Danek et al. "Synthesis of Luminescent Thin-Film CdSe/ZnSe Quantum Dot Composites Using CdSe Quantum Dots Passivated with an Overlayer of ZnSe" *Materials* 8(1):173 (January 1996)

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DS1.375019.1

Substitute Form PTO-1449 (Modified)		U.S. Department of Commerce Patent and Trademark Office	Attorney's Docket No. 01997-276001	Application No. 09/625,861
Information Disclosure Statement by Applicant (Use several sheets if necessary)		Applicant Frederic Mikulec et al.		
		Filing Date July 26, 2000	Group Art Unit	
(37 CFR §1.98(b))				

U.S. Patent Documents							
Examiner Initial	Desig. ID	Patent Number	Issue Date	Patentee	Class	Subclass	Filing Date If Appropriate
	AA	5,990,579	Nov. 23, 1999	Weiss <i>et al.</i>	250	307	Nov. 25, 1997
	AB	5,541,948	Jul. 30, 1996	Krupke <i>et al.</i>	372	51	Nov. 28, 1994
	AC	5,537,000	Jul. 16, 1996	Alivisatos <i>et al.</i>	313	506	Apr. 29, 1994
	AD	5,262,357	Nov. 16, 1993	Alivisatos <i>et al.</i>	437	225	Nov. 22, 1991

Other Documents (include Author, Title, Date, and Place of Publication)		
Examiner Initial	Desig. ID	Document
	AE	"Strongly Photoluminescent CdTe Nanocrystals by Proper Surface Modification," M. Gao <i>et al.</i> , <i>J. Phys. Chem. B.</i> 102:8360-8363 (1998).
	AF	"Photochemistry and Radiation Chemistry of Colloidal Semiconductors. 33. Chemical Changes and Fluorescence in CdTe and ZnTe," U. Resch <i>et al.</i> , <i>Langmuir</i> 5:1015-1020 (1989).
	AG	"An EXAFS Study on Thiolcapped CdTe Nanocrystals," J. Rockenberger <i>et al.</i> , <i>Ber. Bunsenges. Phys. Chem.</i> 102:1561-1564 (1998).
	AH	"Synthesis, Morphology and Optical Properties of Thiol-Stabilized CdTe Nanoclusters in Aqueous Solution," A. L. Rogach <i>et al.</i> , <i>Ber. Bunsenges. Phys. Chem.</i> 101:1668-1670 (1997).
	AI	"Micro photoluminescence spectra of CdTe and CdMnTe self-organized quantum dots," T. Kuroda <i>et al.</i> , <i>Journal of Luminescence</i> 83-84:321-342 (1999).
	AJ	"Quantum confinement effects on the optical phonons of CdTe quantum dots," A.M. De Paula <i>et al.</i> , <i>Superlattices and Microstructures</i> 23:1103-1106 (1998).
	AK	"Probing of the quantum dot size distribution in CdTe-doped glasses by photoluminescence excitation spectroscopy," C.R.M. de Oliveira <i>et al.</i> , <i>Appl. Phys. Lett.</i> 66:439-441 (1995).
	AL	"Synthesis and Characterization of Thiol-Stabilized CdTe Nanocrystals," A.L. Rogach <i>et al.</i> , <i>Ber. Bunsenges. Phys. Chem.</i> 100:1772-1778 (1996).
	AM	"Synthesis and Characterization of Surface-Modified Colloidal CdTe Quantum Dots," T. Rajh <i>et al.</i> , <i>J. Phys. Chem.</i> 97:11999-12003 (1993).
	AN	"Nanoparticle precursor route to low-temperature spray deposition of CdTe thin films," M. Pehnt <i>et al.</i> , <i>Appl. Phys. Lett.</i> 67:2176-2178 (1995).
	AO	"Characterization of Solution-Synthesized CdTe and HgTe," M. Müllenborn <i>et al.</i> , <i>Applied Physics</i> A56:317-321 (1993).
	AP	"Solution Synthesis and Photoluminiscence Studies of Small Crystallites of Cadmium Telluride," R. F. Jarvis, Jr. <i>et al.</i> , <i>Mat. Res. Soc. Symp. Proc.</i> , 272:229-235 (1992).

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